DOCUMENT RESUME

ED 468 242 CS 511 305

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TITLE	Are My Students Collaborating Effectively in My Classroom?
PUB DATE	2001-12-00
NOTE	13p.; Paper presented at the Annual Meeting of the Australian Association for Research in Education (Fremantle, Western Australia, December 2-6, 2001).
AVAILABLE FROM	For full text: http://www.aare.edu.au/01pap/que01466.htm.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Classroom Environment; Classroom Techniques; *Cooperative Learning; Foreign Countries; Grade 6; Instructional Improvement; Intermediate Grades; Student Attitudes
IDENTIFIERS	Singapore

ABSTRACT

In the primary school classrooms, students spend almost three terms (20-25 hours) doing project work in groups of 4-5. In order for any learning task to be conducted effectively, the students need to know how to work collaboratively in their groups, and teachers need to find out how their students perceive one another while working in their groups. This will in turn help teachers help their students build the interdependence and team spirit needed to develop the correct attitude toward project work. The objectives of this study are to assist teachers better understand how their students collaborate with one another in their groups, and to suggest strategies to enhance students' collaboration in the classroom. Subjects were 39 primary (grade 6) students from an all-girl school in Singapore. Using one of the standard learning environment instruments, the My Class Inventory (MCI), students' perceptions of their actual and preferred learning environments are assessed. This paper will report the results and suggest how it will be used to assist in developing appropriate strategies to enhance collaboration in project work classrooms. (Contains 12 references, 4 tables, and 2 figures.) (Author/RS)

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ED 468 242

Are My Students Collaborating Effectively in My Classroom?

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ABSTRACT

In the primary school classrooms, students spend almost three terms (20-25 hours) doing project work in groups of 4-5. In order for any learning task to be conducted effectively, the students need to know how to work collaboratively in their groups, and teachers need to find out how their students perceive one another while working in their groups. This will in turn help teachers help their students build the interdependence and team spirit needed to develop the correct attitude toward project work.

The objectives of this study are to assist teachers better understand how their students collaborate with one another in their groups, and to suggest strategies to enhance students' collaboration in the classroom.

Using one of the standard learning environment instruments, the My Class Inventory (MCI), students' perceptions of their actual and preferred learning environments are assessed. This paper will report the results and suggest how it will be used to assist in developing appropriate strategies to enhance collaboration in project work classrooms.

Key Words: Other (Classroom environment)

Paper presented at the Annual Conference of the Australian Association for Research in Education, Fremantle, 2-6 December 2001

CS 511 305

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INTRODUCTION

Over the last five years, several new initiatives have been implemented in the Singapore education system. These include National Education, Information Technology (IT), Thinking Programme (TP) and Project Work (PW). These initiatives aim to prepare our students for the challenges in the 21st century and to achieve our vision of Thinking Schools and a Learning Nation. In particular, the Project Work (PW) initiative aims to provide students with opportunities to explore the inter-relationships and inter-connectedness of subject-specific knowledge (Jacobs, 1989). Using the PW approach to learning, students will be able to apply creative and critical thinking skills, improve communication skills (both oral and written), foster collaborative learning skills, and develop self-directed inquiry and life long learning skills (Ministry of Education, 1999). With the teachers as facilitators, the students work collaboratively in groups of 4-5 (Goodsell, Maher, Tinto, Smith & MacGregor, 1992) over a period of about 25 hours of curriculum time to complete the learning task. Since students spend much of their curriculum time in completing the project, they would be the best judges as to what they have experienced in carrying out project work.

Research on student and teacher perceptions of classroom learning environment had provided useful information for teachers, parents and administrators in the teaching-learning setting. By using the perceptual information provided by students, the schools would then be able to address the gaps that exist in the learning environment. PW is a new initiative and the processes of teaching and learning in the PW classroom would be of concern to teachers, students and school administrators. In this study, the My Classroom Inventory (MCI) was chosen to assess how students perceived PW classroom learning environment as they worked collaboratively in groups of 4-5 (Hill & Hill, 1990).

OBJECTIVES

1. To assess the PW classroom learning environment of a primary school using a modified version of the classroom environment questionnaire, My Classroom Inventory (MCI),

2. To identify differences in perceptions of the PW classroom environment between

    a. the actual and preferred forms of MCI,
    b. the teacher and students, and

3. To suggest strategies to address the teacher-student perceptual differences that exist in the PW classroom.

BACKGROUND

The My Class Inventory (MCI) was simplified from the Learning Environment Inventory (LEI). In 1960s, the LEI was developed and validated in conjunction with the evaluation and research related to Harvard Projects Physics (Fraser, Anderson & Walberg, 1982).

The original version of the MCI contained 9 items per scale. Due to the low reliability of several of the original MCI scales, item analysis techniques were applied to improve scale reliability (Fraser, 1977). With further refinement, a new 38-item version of the MCI evolved. It contained 6 items in the Cohesiveness scale, 8 items each in the Friction and Difficulty scales, 9 items in the Satisfaction scale and 7 items in the Competitiveness scale (Fraser, Anderson & Walberg, 1982).

The newly improved MCI contained 5 of the LEI's original 15 scales (Cohesiveness, Friction, Satisfaction, Difficulty and Competitiveness). With the young children in mind, MCI offered several advantageous in terms of simple language and direct response to the questionnaire. The final form of the MCI contained 38 items with a 2-point (YES-NO) response format instead of the original 4-point response format. Subsequently, a short version of 5 scales was developed with the intention of minimizing cost and technology accessibility (Fisher and Fraser, 1981).

Recently, Goh, Young and Fraser (1995) had successfully used a 3-point response format (Seldom, Sometimes and Most of the time) with a modified version of the MCI which included a Task Orientation scale.

In past classroom environment research, several researchers used the MCI to investigate the associations between students' cognitive learning outcomes and their perceptions of the psychosocial characteristics of their classrooms. Among the significant association studies reported, Fraser and O'Brien (1985) investigated the associations between elementary school classroom environment and student achievement. Strong association between achievement measures and classroom environment dimensions was found in the MCI when the class mean was used as the unit of analysis. Student perceptions of their classroom environment accounted for 77% of the variance in word knowledge and 72% of the variance in comprehension. Hence, the performance on both word knowledge and comprehension measures was greater in classes perceived by students to have more satisfaction, less friction, less difficulty and less cohesiveness.

Recently, Goh and Fraser (1996) reported that achievement was related to the climate dimensions (MCI) studied and student attitudes for primary school mathematics. In terms of gender differences, boys achieved better results than girls. On the other hand, the girls generally viewed their classroom environment more favourably than the boys did.

METHODOLOGY

Sample

A class of 39 primary 6 (Grade 6) students from an all-girl school took part in the study. These were the high ability students who studied either English and Mother Tongue as first languages (called EM1 stream) or English as first language and Mother Tongue as second language (called EM2 stream). These students were briefed about the requirement

of an interdisciplinary project task and taught Just-in-Time skills (JITs) during PW lessons. These students worked in groups of 4 and spent about 20-25 hours carrying out the interdisciplinary project task entitled 'Asean Countries'. At the end of the project, the students presented their project to the class. The teacher who conducted PW lessons for the class also participated in the survey.

Instrument

The short 25-item My Class Inventory (MCI) (Fisher & Fraser 1981; Fraser et al. 1982) was used in this study. Table 1 shows a brief description of the scales and Moos's scheme of five scales.

Table 1 Description for Each Scale of the My Class Inventory (MCI)

Scale Name	Items Per Scale	Description of Scale	Moo's Scheme
Satisfaction (SA)	5	Degree to which students enjoy learning and their class.	Relationship
Friction (FR)	5	Degree to which students do not get along and are unfriendly to one another.	Relationship
Competitiveness (CM)	5	Degree to which the students compete with classmates.	Personal Development
Difficulty(DI)	5	Degree to which students experience difficulty in their learning tasks.	Personal Development
Cohesiveness (CH)	5	Degree to which students feel a sense of belonging.	Relationship

The distinctive features of 25-item MCI included:

1. five scales
2. simple language
3. two-point response scale
4. direct answer on the question paper
5. complete within 10-15 mins

These features have warranted the MCI to be chosen for use in this study. There are a total of 25 items arranged in cyclic order and in blocks of five to enable easy calculation. The first item in each block assesses Satisfaction (SA); the second item in each block assesses Friction (FR); the third item assesses Competitiveness (CM); the fourth item assesses Difficulty (DI); and the last item in each block assesses Cohesiveness (CH).

The 25-item short form MCI (Table 2) was modified and adapted for use in the project-based classroom learning environment. By examining the Satisfaction and Difficulty scales, only minor modifications were made by changing words such as 'schoolwork' to 'project work'. The word 'project' was used in most of the items except in scales such as Friction. The modified MCI (Table 2) was used to gauge the students' and teachers' perceptions of the existing project-based classroom learning environment.

The scoring procedure was straight forward for 20 items of MCI in that 3 is given for the 'Yes' response and 1 is given for the 'No' response. However, the reverse scoring procedure was used for the remaining five reverse items in that 1 is given for the 'Yes' response and 3 is given for the 'No' response.

Table 2 Description for Each Scale of the Modified My Class Inventory (MCI)

Scale Name	Items Per Scale	Item Number	Sample Item
Satisfaction (SA)	5	1,6,10,11,16,21	The students enjoy their project work in my class.
Friction (FR)	5	2,7,12,17,22	Certain students always want to have their own way.
Competitiveness (CM)	5	3,8,13,18,23	Students often race to see who can finish first.
Difficulty (DI)	5	4,9,14,19,24	In my class the project work is hard to do.
Cohesiveness (CH)	5	5,10,15,20,25	In my class everybody is my friend.

* $p<0.05$ ** $p<0.01$ N=39

Procedures

Two sets of questionnaire (actual and preferred versions) were administered to 39 students and 1 teacher. They took about one period (30 mins) to complete the questionnaire. Instructions were read to all students and teacher before they responded to the items in the questionnaire.

Data Analysis

Using Microsoft Excel and SPSS, internal consistency reliability, item means and paired t-test were calculated.

FINDINGS AND DISCUSSION

Internal Consistency Reliability (Cronbach Alpha Coefficient)

A summary of the internal consistency reliability for the MCI (actual and preferred versions) is presented in Table 3. The Cronbach alpha coefficient for each MCI scale was calculated as a measure of internal consistency reliability.

Table 3 Internal Consistency Reliability (Cronbach Alpha Coefficient)

MCI Scale	No. of Items	Form	Alpha Reliability
Satisfaction (SA)		Actual	0.77
	5	Preferred	0.87
Friction(FR)		Actual	0.67
	5	Preferred	0.71
Competitiveness (CM)		Actual	0.72
	5	Preferred	0.79
Difficulty (DI)		Actual	0.25
	3	Preferred	0.47
Cohesiveness (CH)		Actual	0.82
	5	Preferred	0.92

In Table 3, the alpha reliability ranged from 0.25 to 0.82 for the actual version of MCI and 0.47 to 0.92 for the preferred version of MCI. The alpha reliability for the difficulty scale was extremely low in the actual version of MCI. The low score obtained for the Difficulty scale could be due to the students' difficulty in understanding Item 9. From the questionnaire, it was observed that there was a mixture of responses for Item 9 of the Difficulty scale.

'Most of my group members can do their part of the project without help.'

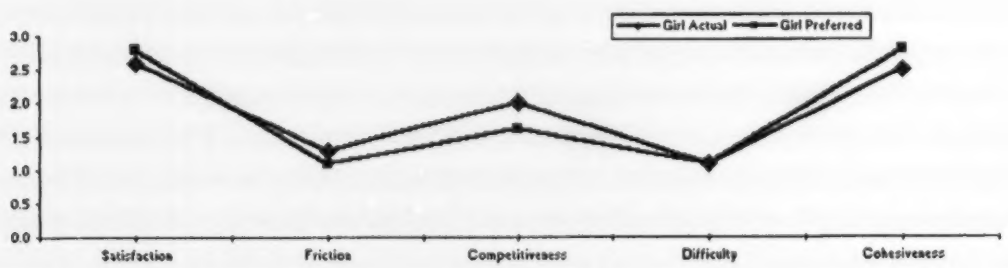
This was the first collaborative project that the students did. Perhaps, some students asked for help either at home or in school in completing the project task. The scope of the project was rather broad and some of the students needed help in sourcing for information as well as processing of the information gathered. On the other hand, there were some groups of students who did not need to ask for any assistance outside the curriculum time of project work. Also the project task required students to work in groups of 4, some students could have experienced some uncertainty in working with one another. Table 3 showed Three (Satisfaction, Competitiveness and Cohesiveness) out the five MCI scales

had Cronbach Alpha Coefficient above 0.7. These three scales had rather comparable values as the actual version of MCI conducted in the previous studies (Fraser & O'Brien, 1985; Fraser, Malone & Neale, 1989).

Comparison of Student Actual and Preferred Perceptions on MCI

In Table 4, the paired t-test (2-tailed) calculated for the actual and preferred MCI showed 4 significant differences except the Difficulty scale. These four significant differences were found for the Satisfaction, Friction and Competitiveness ($p<0.05$) and Cohesiveness ($p<0.01$) dimensions.

Figure 1 shows the graph of significant differences between students' actual and preferred perception scores on the MCI. Both the actual and preferred versions of MCI showed similar trends. The students perceived high means scores in Satisfaction, Competitiveness and Cohesiveness scales but low in Friction and Difficulty scales in their existing PW classroom learning environment. The students also preferred a lesser degree of Friction and Competitiveness than what they are experienced in their actual PW learning classroom environment. As was mentioned earlier, these are high ability students who could have already experienced a high degree of competitiveness and friction in their classroom. Although in Project Work, the emphasis was on collaborative learning. Hence, this could explain why these students preferred a lesser degree of friction and competitiveness. Also, these students preferred a more satisfying and a more cohesive PW learning classroom environment.



Overall, the mean scores obtained for all the five MCI scales indicated that the PW classroom learning environment was conducive for students to collaborate effectively.

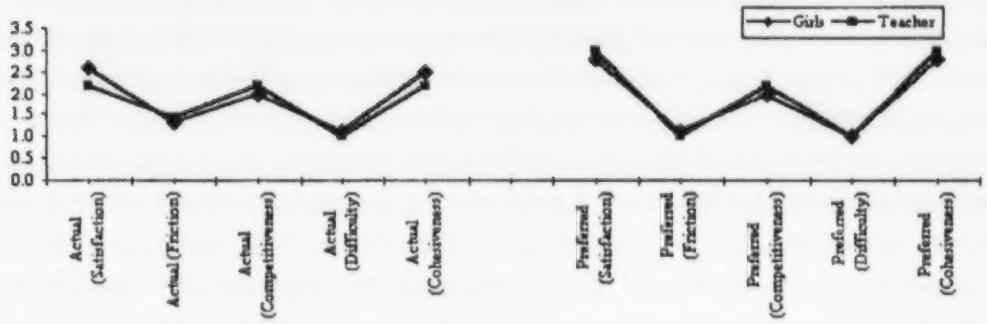
Comparison of Student and Teacher Actual and Preferred Perceptions on MCI

In Table 4, the student and teacher perceptions on MCI was shown. Generally, the students and teacher indicated almost similar trend of their actual and preferred perceptions. Also in Figure 2, the student and teacher perceptions on the MCI (Actual) indicated that the teacher perceived a lower degree of cohesiveness and satisfaction than the students. Perhaps, the teacher had set high expectations of this high ability class and therefore would expect more from the students. On the other hand, the teacher perceived this class to be rather competitive during PW lessons. As these students were the better students of a single sex primary 6 (Grade 6) cohort, it would mean that they are already placed in a highly competitive environment.

Table 4 Item Mean for Students and Teacher for Actual and Preferred Forms of MCI

MCI Scale	No. of Items	Form	Mean	
			Student	Teacher
		Actual		2.2
Satisfaction (SA)	5	Preferred	2.6*	3.0
		Actual	2.8*	1.4
Friction (FR)	5	Preferred	1.3*	1.0
		Actual	1.1*	2.2
Competitiveness (CM)	5	Preferred	2.0*	1.8
		Actual	1.6*	1.0
Difficulty (DI)	5	Preferred	1.1	1.0
		Actual	1.0	2.2
Cohesiveness (CH)	5	Preferred	2.5**	3.0
			2.8**	

* $p < 0.05$ ** $p < 0.01$ N=39



Interestingly, both students and teachers perceived a similarly low degree in two scales: Friction and Difficulty in their PW classroom. This could suggest that these students generally could get along and they worked well in their collaborative groups. The low difficulty score indicated that the students could cope with the project task without difficulty.

For the preferred version of the MCI, the teacher and students seemed to prefer a higher degree of Satisfaction and Cohesiveness in the PW classroom than what was existing. In fact, the teacher wanted more of these than the students did. Both teacher and students preferred a lower level of friction and competitiveness in their PW learning environment as shown in Figure 2. In terms of the difficulty dimension, both teacher and students were satisfied with the difficulty level of the project task currently assigned.

CONCLUSION

This study set out to investigate the PW classroom learning environment in a single sex primary school. The Cronbach alpha reliability ranged from 0.25 to 0.82 for the actual version of MCI and 0.47 to 0.92 for the preferred version of MCI.

By using the perceptual information provided by students and teacher, the gaps that exist in the PW learning environment could be addressed. The gaps were indicated by the significant student perceptual differences in Satisfaction, Friction, Competitiveness and Cohesiveness scales. In order to enhance the cohesiveness and satisfaction of the collaborative groups in PW learning environment, teambuilding activities should be incorporated at the initial stage of PW lessons (Goodrich, Hatch, Wiatrowski & Unger, 1995). This will also help to reduce the competitiveness and friction in the existing learning environment. Teachers should hold regular student-teacher conferencing to better understand the learning needs of the students. Last but not least, time has to set aside for students to write their reflection logs. In terms of difficulty level of the project task, the teachers did select an appropriate project task to meet the learning needs of the students. As one of the learning outcomes of PW is collaboration, the teacher would need

to emphasis this aspect in the PW classroom. As PW is a new initiative, teachers would also need to play a more effective facilitative role in helping the students to pick up skills as they embark on interdisciplinary project collaboratively (Post, Ellis, Humphreys& Buggey, 1997).

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